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Abstract

This paper investigates socio-economic factors affecting household income among ethnic minorities in North-West Mountains – the poorest region of Vietnam. The findings revealed that the vast majority of the sample households heavily depended on agricultural activities, with very limitted access to nonfarm employment. Factors affecting household income were analyzed using multiple regression models and the results confirm the crucial role of education, non-farm employment and fixed assets in improving household income. Also, some community characteristics such as the presence of means of transportation, post offices and nonfarm job opportunities were found to have a significantly positive impact on household income. The findings imply that policies for poverty reduction should aim at both commune and household levels in the study area.

Keywords: Ethnic minorities, nonfarm participation, household income, North-West Mountains.

JEL classification codes: I 32, O12, J15

1. Introduction

Vietnam has 54 ethnic groups, of whom the Kinh (Viet) are by far the biggest group, accounting for nearly 74 million people (85.7 percent of the total population) (WB, 2012). There are five other ethnic groups (the Tay, Thai, Muong, Khmer, and H'mong) having populations of more than 1 million, and another three (the Nung, Dao, and Hoa) with populations being between 500,000 and 1 million. There are also a number of ethnic groups whose populations are less than 5,000 people. With the exception of the Hoa (Chinese), Khmer, and the Cham, other ethnic minority groups mainly reside in highland or upland areas, away from the coastal plains and major cities. The largest minority populations live in the North-West and North-East and the Central Highland regions, although there are also ethnic minority groups in the North-Central, South-Central, and Mekong regions (WB, 2012).

Vietnam has recorded great achievements in economic growth and poverty reduction over the past two decades. The share of population living below the poverty line reduced significantly from 58 percent in 1993 to 20 percent in 2004 and 15 percent in 2010 (Cuong, 2012). Despite prominent progress in alleviating overall poverty, including a steady reduction in ethnic minority poverty, there remains a large and increasing gap in living standards and poverty rates between the Kinh majority and ethnic minorities. The proportion of minorities among the poor increased from 29 percent in 1998 to 47 percent in 2010. There was still about 66 percent of ethnic minorities living below the poverty line and around 37 percent living below the extreme poverty line in 2010. By contrast, the figures for the King Majority population were only about 13 percent and 3 percent, respectively WB (2012). Especially, there is a substantial proportion of ethnic minorities living in North-West Mountains with a very low income and limited access to infrastructure, education, health services and nonfarm employment (Cuong, 2012). About 73 percent of the ethnic minorities in this region were still poor and 45.5 percent were extremely poor in 2010 (WB, 2012).

Possibly due to the widening gap in living standards between the ethnic minority and majority groups in Vietnam, an increasing number of studies has examined the disparity in income or expenditure consumption between the two groups (e.g, Baulch, Chuyen, Haughton, & Haughton, 2007; Baulch, Hoa, Phuong, & Hung, 2011; Cuong, 2012; Minot, 2000; Van de Walle & Gunewardena, 2001). However, to the best of my knowledge, very

few studies investigate factors affecting household income among the ethnic minorities in Vietnam and furthermore, no study examines the determinants of household income among the ethnic minorities in North-West Mountains. A better understanding of what factors affecting household income of the ethnic minorities in this poorest region is much of importance, when designing policy interventions to improve their welfare. Hence, the current study was conducted to fill in this gap in the literature.

The main objective of this study is to examine the socio-economic determinants of household income among ethnic minority households in the Northwest Mountains, Vietnam .This is the first study to analyze both commune and household factors affecting household income by using a unique data set from a recent survey of Northern Mountain Baseline Surveys. Therefore, the study added to the extant literature by providing the first econometric evidence for factors affecting household income of the ethnic minorities in the poorest region of Vietnam.

The paper is structured into four sections. The next section describes data source and econometric models used in this study. The third section presents the determinants of household income while the conclusion and policy implications are presented in the fourth section.

2. Data and methods

2.1. Data source

The commune and household data from the Northern Mountains Baseline Survey (NMBS) 2010 were utilized for the current study. The 2010 NMBS was conducted by General Statistical Office of Vietnam (GSO) from July to September in 2010 to collect baseline data for the Second Northern Mountains Poverty Reduction Project. The main task of this project is to focus on reducing poverty in the Northern Mountains region, Vietnam. The project has invested in productive infrastructure and provided supports for the poor to promote both farm and nonfarm activities. The project was implemented in six provinces in the North-West region, including Hoa Binh, Lai Chau, Lao Cai, Son La, Dien Bien and Yen Bai (Cuong, 2012).

A multi-stage sampling technique was employed for the survey. Firstly, 120 communes from six aforementioned provinces were randomly chosen following probability proportional to the population size of the provinces. Secondly, from each of these selected

communes, three villages were randomly selected and then five households in each village were randomly chosen for the interview, yielding a total sample size of 1,800 households. The survey covered a large number of households from various ethnicities such as Tay, Thai, Muong, H'Mong and Dao.

Both household and commune data were gathered for the survey. The household data consist of characteristics of family members, education and employment, healthcare, income, housing, land, access to credit, fixed assets and durables. The commune data contain information about the characteristics of communities such as demography, population, infrastructure, and nonfarm job opportunities. The commune data can be merged with the household data.

2.2. Data analysis

The main statistical analyses applied in this study were descriptive statistics and regression analyses. First, households were grouped into poor and non-poor households using the poverty line for rural (400 thousand VND/person/month). Once households were divided into poor and non-poor groups, statistical analyses were then applied to compare the means of household characteristics and assets between the two groups. Analysis of Variance (ANOVA) models were used to compare the mean of household characteristics and assets between the two groups. In addition, a chi-square test was utilized to analyze whether a statistically significant link existed between two categorical variables such as the type of households (poor and non-poor households) and the types of employment.

Because the dependent variable (household income per capita) is a continuous variable, econometric models using ordinary least squares were used in the study. The regression models were used to analyze relationships between per capita household income and various explanatory variables, including household and commune-related variables. Specifically, several explanatory variables were selected as being important to household income (Table 1). These were (i) household size, dependency ratio, gender, age and education of household head; (ii) owned farmland size per capita; the log of total values of all fixed assets; total value of loans; (iii) participation in non-farm activities; (iv) the presence of means of transportation, paved roads, post office, irrigational work and nonfarm job opportunities and population density. We ran two models. Model 1 used all household variables but not commune variables while Model 2 included both commune and household

variables. We addressed the heteroscedasticity by transforming income per capita and value of fixed assets into their natural logarithms. In addition, the option " pweight" in STATA was used to account for sampling weights, which also produces robust standard errors in both models.

Table 1: Definition and measurement of explanatory variables included in the models

Explanatory variables	Definition and measurement	Expected sign
Household size	Total household members (persons)	-
Dependency ratio[b]	Proportion of dependents in the households	-
Age	Age of household head (years).	+/-
Age squared	The squared age of household head (Year)^2	+/-
Gender[a]	Whether or not the household head is male (Male=1; female=0).	+/-
Primary education[a]	Whether or not the household head completed the primary school	+
Lower secondary[a]	Whether or not the household head completed the lower secondary school	+
Upper secondary and higher[a]	Whether or not the household head completed the upper secondary school or higher level	+
Annual crop land	The size of annual crop land per capita (100 m^2 per person)	+
Perennial crop land	The size of perennial crop land per capita (100 m^2 per person)	+
Forestry land	The size of forestry land per capita (100 m^2 per person).	+
Water surface for aquaculture	The size of water surface for aquaculture per capita (100 m^2 per person)	+
Fixed assets	Total value of all fixed per capita (Log of one thousand VND)	+
Credit	Total value of loans that the household borrowed during the last 24 months before the time of the survey (one million VND)	+
Wage employment[a]	Whether or not the household engaged in paid jobs	+
Nonfarm self-employment[a]	Whether or not the household took up nonfarm self-employment	+
Paved road[a]	Is there any paved road to the commune in which the household lived?	+
Means of Transportation[a]	Whether or not means of transportation such as minibuses; passenger cars, vans, three-wheel taxis or motorbike taxis are available in the commune in which the household lived.	+
Irrigational work[a]	Is there any irrigational work in the commune in which the household lived?	+
Post office[a]	Is there any post office within the commune in which the household lived?	+
Off-farm opportunities[a]	Is there any production/services unit or trade village located in the distance that the people in the commune can go there to work and then go home every day?	+
Population density	Number of people per one square kilometer	+/-

Note: [a] indicates dummy variables (1=Yes; 0=otherwise). [b] this ratio is calculated by the number of female members aged under 15 and over 59, and male members aged under 15 and over 65, divided by the number of female members aged 15-59 and male members aged 15-64.

3. Results and discussion

3.1. Background on household characteristics and income

Table 2 shows that there are considerable differences in the mean values of almost household characteristics between the two groups. The poor had a larger household size and much higher dependency ratio than that of the non-poor. The differences in the age and education of heads between the two groups were also statistically significant. The heads of poor households were approximately three years younger than those of non-poor households. The heads of poor households attained a lower rate of school completion (at all levels) than those of non-poor households. Unsurprisingly, the participation rates in both wage and nonfarm self-employment were found to be lower for the poor than the non-poor. However, the rate of credit participation was not different the two groups.

Table 2: Descriptive statistics of household and commune characteristics, by income group

Explanatory variables	All households		Non-poor households		Poor households		t-value or Pearson chi2
	Mean	SD	Mean	SD	Mean	SD	
Household characteristics							
Household size	6.01	(2.32)	5.22	(1.80)	6.40	(2.50)	***
Dependency ratio	0.83	(0.69)	0.58	(0.60)	0.97	(0.70)	***
Age of household head	41.46	(12.82)	43.23	(12.06)	40.44	(13.13)	***
Gender of household head[a]	0.92	(0.26)	0.92	(0.27)	0.93	(0.26)	
Credit participation[a]	0.40	(0.49)	0.41	(0.49)	0.39	(0.49)	
Wage employment[a]	0.32	(0.47)	0.45	(0.50)	0.25	(0.43)	***
Nonfarm self-employment[a]	0.11	(0.32)	0.14	(0.34)	0.10	(0.30)	*
Education							
Primary education[a]	0.23	(0.42)	0.25	(0.43)	0.21	(0.41)	***
Lower secondary[a]	0.18	(0.38)	0.25	(0.43)	0.14	(0.34)	***
Upper secondary and higher[a]	0.05	(0.21)	0.09	(0.29)	0.02	(0.14)	***
Assets/Wealth							
Annual crop land	1,851	(1,736)	2,432	(2,197)	1,574	(1,312)	***
Perennial land	95.7	(506)	178	(755)	48.6	(267)	***
Forestry land	1,517	(8,557)	1,262	(5,032)	1,661	(1,003)	***
Water surface for aquaculture	16.17	(190)	24.74	(130)	11.30	(219)	
Value of fixed assets	23.60	(28.82)	35.00	(40.40)	16.72	(15.05)	***
Monthly income per capita[b]	390	(336)	712	(432)	238	(84)	***
Commune characteristics							
Paved road[a]	0.22	(0.42)	0.22	(0.42)	0.23	(0.42)	*
Transportation[a]	0.33	(0.47)	0.40	(0.49)	0.29	(0.46)	***
Irrigation[a]	0.77	(0.42)	0.78	(0.41)	0.77	(0.42)	
Post office[a]	0.93	(0.25)	0.96	(0.19)	0.91	(0.28)	***
Off-farm job opportunities[a]	0.23	(0.42)	0.30	(0.46)	0.19	(0.39)	***
Population density	156	(379)	196	(425)	133	(349)	*

Note: estimates are adjusted for sampling weights. SD: standard deviations. *, **, *** mean statistically significant at 10%, 5 % and 1 %, respectively. [a] means dummy variables. [b] measured in VND 1,000. USD 1 equated to about VND 19 thousand in 2010.

Table 2 shows that the poor earned a very low level of per capita income, which is just equivalent to one third of that earned by the non-poor. The differences in all types of land and the total value of fixed assets between the two groups are found to be highly statistically significant. The area of annual crop land per capita held by non-poor households was quite higher than that owned by poor households. In addition, the non-poor households had much more perennial crop land than that of the poor-households. However, the non-poor owned less forestry land than that of the poor. This can be explained by the fact that there are several programs and policies that provided forestry lands for the ethnic minority poor in this region (Cuong, 2012). The non-poor also had a total value of fixed assets that nearly doubled that of the poor. Remarkable differences in some household characteristics and assets between the two groups were expected to be closely linked variations in household income.

Table 3 shows that agriculture activities contributed the largest share of total household income for ethnic minorities in North-West Mountains. Combined together, the income from crop, livestock, forestry, and aquaculture accounted for nearly 80 percent of total income. However, the income from nonfarm activities (wage and self-employment) made up only about 13 percent of the total income, while the rest share was contributed by other sources. By contrast, the income from nonfarm sources contributed about 60 percent of total income for Kinh ethnic majority households. This implies that agriculture remains an important role in the livelihood of the ethnic minorities in the study region. A closer look at the income structure of income groups revealed that the crop income share of the poor is much larger than that of the non-poor. Nevertheless, the poor received less income from forestry and livestock than the non-poor. The poor also earned much less income from both wage and nonfarm self-employment than the non- poor. Also, the poor received less income from other sources than the non-poor. The data suggest that differences in income sources between the two groups might explain for the differences in income per capita between them.

Table 3: Household income share by source

Income sources	Kinh ethnic majority	Ethnic minorities	Non-poor ethnic minorities	Poor ethnic minorities
Wage employment	0,42	0,11	0,17	0,07
Nonfarm self-employment	0,19	0,02	0,03	0,01
Crop	0,15	0,62	0,45	0,72
Livestock	0,04	0,09	0,13	0,07
Forestry	0,01	0,06	0,10	0,04
Aquaculture	0,02	0,01	0,02	0,01
Other	0,17	0,09	0,12	0,08

Source: author's own calculation from the 2010 NMBS and Vietnam Household Living Standard Survey 2010 (VHLSS 2010).

3.2. Determinants of household income

Table 3 reports the results from Model 1 with household variables and Model 2 with both commune and household variables. As compared to Model 1, Model 2 has a higher R-squared value with more statistically significant variables. Model 2 explains roughly 50 percent of the variation in household income. In addition, many coefficients are highly statistically significant ($p<0.05$) with their signs as expected. As shown in Model 2, the coefficient of wage employment indicates that, holding all other variables constant, households that took up wage employment would, on average, have an income per capita level approximately 30 percent higher than those without nonfarm employment. The corresponding figures for those with nonfarm self-employment were about 14 percent. This suggests that households can significantly improve their income by participating in any type of nonfarm employment. In general, this finding is also in accordance with that of Pham, Bui, and Dao (2010), Van de Walle and Cratty (2004) and Tuyen, Lim, Cameron, and Huong (2014).

Both household size and dependency ratio are negatively related to income per capita. The finding is consistent with Jansen, Pender, Damon, Wielemaker, and Schipper (2006) and Tuyen et al. (2014) who found that having more dependent members and more family members in general, seems to reduce per capita income. Holding all other variables constant, an additional family member corresponds with a decrease in income per capita of about 9 percent in both models. The positive sign of the age of household head and the negative sign of its squared term suggest that the age of household head has a diminishing impact on household income. Not as expected, the gender of household head does not affect household

income. All levels of education have an increasing effect on household income per capita and this effect significantly increases with the levels of education. The income per capita would be 7 percent, 20 percent and 53 percent higher for a household with the head attaining a primary diploma, a lower secondary diploma and an upper secondary diploma or higher, respectively. Similar finding were also found in previous studies in peri-urban Vietnam (Tuyen et al., 2014) and rural Vietnam (Nguyen, Kant, & MacLaren, 2004).

Table 3: Determinants of household income

Explanatory variables	Model 1		Model 2	
	Coefficient	SE	Coefficient	SE
Household characteristics/assets				
Household size	-0.0891***	(0.008)	-0.0908***	(0.009)
Dependency ratio	-0.0681***	(0.023)	-0.0599**	(0.025)
Age	0.0251***	(0.007)	0.0266***	(0.008)
Age squared	-0.0002***	(0.000)	-0.0002***	(0.000)
Gender	-0.0864	(0.057)	-0.0964	(0.068)
Primary	0.0756**	(0.037)	0.0710*	(0.040)
Lower secondary	0.2047***	(0.045)	0.1974***	(0.046)
Upper secondary and higher	0.5208***	(0.081)	0.5333***	(0.084)
Annual crop land	0.0123***	(0.001)	0.0119***	(0.001)
Perennial crop land	0.0111***	(0.004)	0.0095**	(0.004)
Forestry land	-0.0001	(0.000)	-0.0001	(0.000)
Aquaculture	0.0143	(0134)	0.0127	(0.011)
Fixed assets	0.1614***	(0.015)	0.1732***	(0.016)
Credit	0.0003	(0.000)	0.0001	(0.000)
Wage employment	0.2758***	(0.034)	0.2913***	(0.036)
Nonfarm self-employment	0.0666	(0.049)	0.1428***	(0.052)
Commune characteristics				
Paved road			-0.0098	(0.034)
Local market			-0.0103	(0.035)
Transportation			0.1724***	(0.035)
Post office			0.2430**	(0.106)
Electricity			0.1999	(0.132)
Irrigational work			0.0386	(0.041)
Nonfarm job opportunities			0.0940**	(0.040)
Population density			-0.0001*	(0.000)
Constant	3.8063***	(0.206)	3.1565***	(0.258)
Observations	1,594		1,374	
R-squared	0.450		0.484	

Notes: estimates are accounted for sampling weights; robust standard errors (SE) in parentheses;
*** p<0.01, ** p<0.05, * p<0.1

Regarding the role of assets in household income, the study found that not all types of land are associated with household income. While both annual and perennial crop lands have a positive effect on household income, this effect was not found for the case of forestry land. Additional 100 m^2 of annual crop land per capita and perennial crop land per capita will

result in an increase in per capita income of 1.2 percent and 0.9 percent, respectively. This finding is consistent with previous studies (Tuyen et al., 2014; Van de Walle & Cratty, 2004) which found a positive relationship between farmland holding and household income in Vietnam's rural and peri-urban areas. The current study found evidence for a significantly positive association between fixed assets and household income. The elasticity of income per capita to higher values of fixed assets is around 0.17 in both models. Nevertheless, we found no statistical relationship between credit and household income. In overall, these findings are in line with Nghiem, Coelli, and Rao (2012) who found that land and assets all have an increasing effect on household welfare in Vietnam.

This study found that some commune variables have a significantly positive effect on household income. Households with equal assets and other characteristics will, on average, have income per capita levels that are about 17 percent higher if they live in communes with the presence of means of transportation. Similarly, living in a commune with the availability of post office and nonfarm job opportunities would increase household income by 24 percent and 9.4 percent, respectively. The findings suggest that household income is considerably affected by some communal factors.

4. Conclusion and policy implications

The objective of this paper is to examine the socio-economic determinants of household income among ethnic minorities in North-West Mountains, Vietnam. Using a unique dataset from a household survey in the study area, this study offered the first evidence of factors determining household income of ethnic minorities in the poorest region of Vietnam. We found that some of both household and commune related factors have significant effects on household income. This suggests that policies for poverty reduction should aim at both household and community levels.

The result of this study shows a strong positive association between non-farm employment and household income. Both participation in wage employment or self-employment in nonfarm activities has rising effects on income per capita. A useful policy implication here is that ethnic minorities can improve their income by intensively taking up non-farm activities. Nevertheless, their ability to access to non-farm activities was

found to be determined by some important factors such as education, land, fixed assets and improved local infrastructure (Tuyen, 2014). The accumulation, value, usefulness of and access to these factors can be greatly affected by institutions and state policies. As a result, policy intervention in these factors can improve household wellbeing by providing favourable conditions for livelihood transition and diversification and/or pushing households towards lucrative non-farm activities.

The regression analysis indicates that some other variables have a positive relationship with household income. Having more annual and perennial crop lands increases household income. However, land distribution policy should not be regarded as a main approach to rural poverty eradication since land is fixed in supply. Instead of this, nonfarm employment should be considered a powerful engine for poverty reduction because it was found to be a positive determinant of household income in the study area. Education and fixed assets all have a positive effect on income per capita. Therefore, a possible implication here is that governmental support for households' access to formal credit can help them have more financial resources and accumulate more productive assets, these, in turn, allow them to earn higher income. Encouraging investment in children's education would be a way to increase living standards for the next generation.

Finally, we found evidence that some commune characteristics such as the presence of means of transportation, post offices and nonfarm job opportunities have a positive impact on household income. It is possible to suggest that promoting the availability of means of transportation and expanding rural nonfarm activities, combined with building up post offices, are expected to help ethnic minorities improve their access to nonfarm employment and household welfare.

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